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November 19, 2003

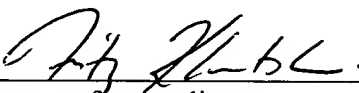
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Sir:

Applicant's undersigned attorney may be reached in our New York office by

telephone at (212) 218-2100. All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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**Patent Office
Canberra**

I, JONNE YABSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PQ 7865 for a patent by CANON KABUSHIKI KAISHA filed on 31 May 2000.

WITNESS my hand this
First day of June 2001

J R Yabsley

JONNE YABSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

ORIGINAL

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION FOR THE INVENTION ENTITLED:

A Method for Active User Feedback

Name and Address of Applicant:

Canon Kabushiki Kaisha, incorporated in Japan, of 30-2, Shimomaruko 3-
chome, Ohta-ku, Tokyo, 146, Japan

Name of Inventor:

Timothy Mark Morris-Yates

This invention is best described in the following statement:

A METHOD FOR ACTIVE USER FEEDBACK

Trademarks

This specification may include words which are, or are asserted to be, proprietary names or trademarks. Their inclusion does not imply that they have acquired, for legal purposes, a non-proprietary or generic significance. Furthermore, no judgement is implied concerning their legal status. In cases where it is considered that proprietary rights may attach to a word, this is indicated by a ^{prop} superscript, noting that this does not imply a legal judgement concerning the legal status of such words.

Technical Field of the Invention

The present invention relates generally to the field of user interfaces and, in particular, to graphic user interfaces. The present invention relates to a method for providing active user feedback in a graphic user interface. The invention also relates to a computer program product including a computer readable medium having recorded thereon a computer program for providing active user feedback in a graphic user interface.

Background Art

Traditionally, when designing a user interface for graphical applications, it is generally accepted that both a working area, and areas for functional “soft” controls are provided. The term “soft control” is used throughout the specification to denote controls which are displayed on a graphic display, rather than implemented in a hardware device.

Fig. 1 shows a graphic display 100, which comprises a working area 104, and a number of control areas which are set aside for functional controls, ie. 102, 106 and 108. An exemplary control 110 is shown in the upper functional control area 102, the particular control 110 being a “scale” adjustment control in a “slider” format.

It is evident from Fig. 1 that a trade-off is required between an amount of available area allocated to the work area 104, and areas 102, 106, and 108 which are allocated to functional controls. On the one hand, the work area 104 should be as large as

possible, however, it is typically desirable to have rapid access to as many functional controls, in a convenient manner, as possible.

Typically, the aforementioned trade-off involves reducing a size of the area allocated to each functional control. This is achieved, however, at the expense of clarity, simplicity and user feedback, resulting in small, cryptic controls, which often do not intuitively indicate the impact of changing the settings. An inexperienced user will, consequently, not necessarily understand what the intended use of a control is. Furthermore, there is frequently little, if any feedback as to the potential results of changing a setting of a soft control, while the control is being adjusted. This results in a “change and wait” sequence for the user, which is inconvenient and frustrating.

Some relief is provided to the user in traditional graphical user interfaces by means of “tool tips” *proprietary*, which typically provide a brief textual description of a control, when the user positions a pointing device cursor over the control.

Disclosure of the Invention

It is an object of the present invention to substantially overcome, or at least ameliorate, one or more disadvantages of existing arrangements.

According to a first aspect of the invention, there is provided a method of providing active user feedback in a graphic user interface, said method comprising steps of:

selecting a soft control currently displayed on the graphic user interface, by means of which soft control a change is capable of being implemented; and

displaying a preview reflecting said change, said preview being provided during said soft control selection, using a preview display region on said graphic user interface.

According to a second aspect of the invention, there is provided a computer readable medium for storing a program for apparatus providing active user feedback in a graphic user interface, said program comprising:

code for a selecting step for selecting a soft control currently displayed on the graphic user interface, by means of which soft control a change is capable of being implemented; and

code for a displaying step for displaying a preview reflecting said change, said preview being provided during said soft control selection, using a preview display region on said graphic user interface.

5 Brief Description of the Drawings

A number of preferred embodiments of the present invention will now be described with reference to the drawings, in which:

Fig. 1 depicts a graphical user interface;

Fig. 2 shows provision of active feedback in accordance with a preferred
10 embodiment of the present invention;

Fig. 3 shows a first view of a pop-up preview in accordance with an embodiment of the present invention;

Fig. 4 shows a first type of animation used in the preferred embodiment;

Fig. 5 shows a refinement of the animation in Fig. 4;

15 Fig. 6 shows a second type of animation applicable to the preferred embodiment;

Fig. 7 shows incorporation of “control ghosting” into the animation shown in Fig. 6;

Fig. 8 depicts the application of the preferred embodiment to a rotary control;

Fig. 9 illustrates an enabling/disabling control function relating to the preview
 20 functionality; and

Fig. 10 is a schematic block diagram of a general purpose computer upon which the preferred embodiment of the present invention can be practiced.

Detailed Description including Best Mode

25 Where reference is made in any one or more of the accompanying drawings to steps and/or features, which have the same reference numerals, those steps and/or features have for the purposes of this description the same function(s) or operation(s), unless the contrary intention appears.

In the context of this specification, the word "comprising" means "including principally but not necessarily solely" or "having" or "including" and not "consisting only of". Variations of the word comprising, such as "comprise" and "comprises" have corresponding meanings.

5 Fig. 2 shows a pop-up preview facility, which is provided in accordance with a preferred embodiment of the present invention. The previously depicted graphical display 100 has, as noted, a work area 104, and a number of other areas, eg. 102, 108 which are set aside for functional controls, eg. 110. Fig. 2 shows a pop-up preview display 200 which is associated with the soft control 110, this association being indicated by dashed
10 lines 202, 204. In the preferred embodiment, when the user wishes to use the control 110, the user is provided with an expanded view showing effects which can be expected from use of the control 110. The preview 200 is presented in a convenient location on the graphical display 100, being shown in the work area 104 in the present Figure. The preview area 200 can, however, be presented in any convenient and ergonomically
15 advantageous position on the graphical display 100, both the location, shape and size of the preview area 200 able to be designed as desired.

 Fig. 3 shows more detail of the pop-up preview embodiment, focusing on a slider-type of soft control 302, which has a slider 304, adjustable along a slot 306. The control 302 is used, in the present example, to adjust the scale of objects displayed in the
20 working area 104. The various embodiments of the present invention described in the specification use terminology associated with a "mouse" pointing device, and use an arrow-shaped cursor which is typically associated with such devices. It is apparent, however, that this is merely exemplary, and not intended to be restrictive. The software control 302 is shown in a view 300 as it appears to the user before the user selects the
25 control 302 in order to assess the effects of making a change thereby. When the user, in a view 308, positions a cursor 320 on the control as shown, a pop-up preview window 312 appears on the right hand side of the control as shown. Three discs 314 to 318 are displayed in the preview window 312. In the present example, the preview window 312 appears when the user both positions the cursor 320 on the control as shown in the view

308, and also activates a button on the mouse pointing device. This type of action is referred to in the specification as "active designation". In the present example, the user, as shown in a view 310, decides not to use the control, and accordingly releases the mouse button, causing the preview window 310 to disappear. In summary, Fig. 3
5 introduces a number of user actions which will be used in various combinations in the specification.

Turning to Fig. 4, a control 402 is shown, in a view 424, prior to the user making a change thereto. The user actively designates the control 402 in a view 408, by both placing a cursor 412 on the control as shown, and pressing a button on the mouse. At this
10 point, a preview window 422 pops up as shown. In a view 410, the user is seen to have adjusted the slider 404 by an amount 414 to the right of its original position as shown in the view 424. Considering the preview window in the view 410, it is seen that the discs which were displayed in the initial preview window in the view 408 have increased in size, this increase reflecting the adjustment 414 which the user has made in the position of
15 the slider control. In a view 416, the user makes a further adjustment 418 in the same direction as the previous adjustment 414, and consequently the size of the discs shown in the preview window are seen to have expanded yet further. When, in a view 420, the user releases the mouse button, with the slider in the position as shown by the location of the cursor in the view 416, the preview window disappears, the change in scale depicted in
20 the preview window between the views 408 and 416 now having been effected. It is noted, that although the aforementioned description has been provided in terms of discs in the preview window, the actual corresponding scale change has been effected in relation to a displayed object, or objects, which the user had previously selected prior to operating the control 402. Thus, for example, if the user has been working on a word processing
25 document, and has selected an area of text which, it is desired, to increase in scale, then selection of the desired text had taken place prior to the description relating to Fig. 4.

The visual feedback, provided to the user by means of the aforementioned technique, allows the user to view the effects of a change in the control, in terms of symbolic "disc" representations in the preview window. The representations in the

preview window are termed symbolic since they do not bear a direct relationship to the graphical object or objects which have been previously selected by the user, and upon which the user wishes to make the actual changes, ie changes of scale in the aforementioned example. This symbolic representation in the preview window is exemplary only, and not intended to be restrictive. Accordingly, the preview window can also display the substantial, ie "actual" selected graphical object or objects upon which the user is operating, for example a selection of text, and so on.

The presentation of a composite display showing a transition between a current display state, eg the discs in the view 408, and a changed display state, eg the discs in the view 416, provide the user with an intuitive understanding of changes which can be expected to arise from use of the control 402.

Fig. 5 shows a preview of a relative size of a symbolic representation as an associated control is adjusted, and also shows a present size as a baseline. Accordingly, in a view 506, a preview window 532 shows three discs, eg. 520, whose present size is consistent with a position of a slide control indicated by a position of a cursor 518. When the slider, in a view 508, is moved, as depicted by a pair of arrows 510, the preview window displays both an original disc size in black 520, and an increase in size consistent with the adjustment 510, this being depicted by a grey annular ring 522. Yet a further adjustment in a view 512, depicted by an arrow pair 514, results in a further change to the preview window, which now shows an original disc size 520, and an even larger annular growth in disc size 526. When, in a view 516, the user releases the mouse button, the preview window disappears, and the size of the actual object being manipulated has been correspondingly changed from an original size corresponding to a disc size 520, to an expanded size corresponding to a disc size 526.

The concept described, therefore, is to provide temporally, a preview which makes use of additional screen real estate, this preview reflecting a change being made, at the time that the change is being considered. Therefore, while the appropriate control is being adjusted, a pop-up preview window showing the impact of the change being made is presented to the user. This additional display is only present while the control is being

changed, and disappears when the control is released. The transition from “control absent” to “control present” can be animated, either by fading, or zooming. The control can also, as an additional effect, be semi-transparent. The preview display also can animate the potential result of the contemplated change, further changing the display as the user changes the value of the control. In addition, the result of a change can be shown simultaneously with an original baseline setting, so that the user can more easily assess the effect of the change. This can be performed by displaying, in the preview window, a current baseline setting, shown semi-transparently in conjunction with an adjusted setting.

In a further embodiment, in order to further clarify the purpose of a control, preview animation can commence when the pointing device is positioned, for a short period without moving, over the particular control. This “training” preview can mimic slow, small changes which the user might make, thus affording the user an idea of the function of the control, without the user having to actively preselect the control. This training preview can differ visually from the actively designated changes previously described, for example by being displayed in a different colour. In this manner, the user can distinguish between training previews, and actual previews used in the course of making an actual change.

In a further embodiment, a yet further degree of clarity can be achieved, by displaying a correlated animated change which incorporates both movement in the control, along with changes in the preview of the effects.

Fig. 6 shows a “training” preview associated with the preferred embodiment of the invention. The training preview shows a nominal change typical of that which can be expected to arise from use of the particular control being considered. A view 608 depicts the control 602 having a slider bar 604 and an adjustment slot 606 prior to selection by the user. A view 610 shows a cursor having been positioned over the slider bar, without any further action by the user, and at this point, no preview screen appears. Turning to a view 612, after some time has passed, with the cursor in the same position as in the view 610, a preview screen 624 appears, showing three discs eg. 626. The positioning of the cursor over the slider bar, if the cursor is allowed to remain there for a time period, is

termed “passive designation” of the slider bar control. Thereafter, in a view 614, although the cursor has not moved relative to the prior view 612, the preview window now shows an original disc size 626 along with a small disc increase 628. In a further view 616, the cursor has again not been moved, and now the preview window again shows the original disc size 626. Thereafter, considering a view 618, the cursor still being in a same position, the preview window shows the original disc size 626, along with a diminished disc size 636. Thereafter, in a view 620, the preview window again shows the original disc size 626. When the cursor 622 is moved away from the control 602 (not shown) the preview window disappears.

Fig. 7 shows a refinement of the aforementioned “training” arrangement. A scale control 702 is shown in a first view 700, the control comprising a slide handle 704 and a range adjustment slot 706. This view affords an indication of how the control 702 appears to the user when it is unselected. In a second view 708, the user has positioned a cursor 710 over the slide handle, and for a while, nothing further happens. Sometime later, in a view 712, a pop-up preview window 740 appears on the right hand side of the control 702, the window containing a number of discs eg. 728. Sometime later, in a view 714, the slide handle 704 has, of its own volition, moved to the right, as shown by a “ghost” handle 722. Simultaneously, the disc 728 has developed an annular growth ring 730 indicating an increase in size corresponding to the movement of the ghost handle 722 relative to an original position of the handle 704. After another time interval, in a view 716 the ghost handle 724 has now reverted to an original position of the slide handle 704, and the disc 734 has reverted to the size shown in the view 712. Still later, in a view 718 the ghost handle 726 has moved leftwards of the handle actual position, and correspondingly, the disc 728 is shown with a diminished size disc 738. Later still, in a view 720, the ghost handle has again moved to the position of the original slide handle 704, and the discs have reverted to their original size as shown in the first view 712. The present arrangement provides a correlated view to a user of a hypothetical adjustment of the control 702, showing corresponding movement of both the slide handle 704, and an indicative size of the displayed discs eg. 728. As described previously, when the user

moves the cursor 710 away from the control 702, the preview window 740 disappears, and the control 702 reverts to its original aspect as shown in the view 700.

Fig. 8 depicts a different style of control 800, this being a “random orientation” dial-type of control. This control comprises an annular ring 802 and a “0” indication arrow 806, as well as an adjustable knob 828, which can be dragged around the annular ring 802, eg to a position 826. An angle subtended by two dashed lines 808 and 804 represents a maximum angle through which selected objects will be rotated, this rotation, however, falling randomly between 0 and that maximum angle. When the control 800 is selected by the user, by placing a cursor 826 on the control knob 828, and adjusting it to a new position 810 by holding down the mouse button and dragging the knob to the position 810, then a preview window 820 appears on the right hand side of the control 800. Furthermore, a number of arrows 812, 816 and 822 appear in the window 820, providing a symbolic representation of a number of previously selected objects in an initial orientation. A number of dashed randomly corresponding symbols 814, 818 and 824, are shown. These randomly rotated symbols have all been rotated with respect to their corresponding unrotated instances 812, 816 and 822 respectively, by random angles which are nonetheless less than a maximum angle subtended by the dashed lines 808 and 804. Although the present arrangement has been described in terms similar to those used in respect of Fig. 5, this is merely exemplary, and not intended to be restrictive.

Fig. 9 shows how a user can enable, or disable, the preview and/or the ghosting functions as described in the previous figures. A scale control 900 is shown, along with shaded triangles 904 and 902 in the right hand corners of the control. The user is able to enable a ghosting feature by placing a cursor 910 on the bottom right hand corner of the control 900 and clicking on the mouse button. This action will produce a shaded corner 902 as shown, indicating that the ghosting function has been enabled, as illustrated by a box 908. The box 908 is shown for clarity in the figure, and does not actually appear on the PC display. Similarly, an upper right hand corner 904 of the control 900 can be selected, enabling, or in contrast disabling, the preview function as depicted by a box 906.

The method of providing active user feedback in a graphic user interface is preferably practiced using a conventional general-purpose computer system 1000, such as that shown in Fig. 10 wherein the processes related to Figs. 2 to 9 may be implemented as software, such as an application program executing within the computer system 1000. In particular, the steps of method of providing active user feedback in a graphic user interface are effected by instructions in the software that are carried out by the computer. The software may be divided into two separate parts; one part for carrying out the providing active user feedback in a graphic user interface methods; and another part to manage the user interface between the latter and the user. The software may be stored in a computer readable medium, including the storage devices described below, for example. The software is loaded into the computer from the computer readable medium, and then executed by the computer. A computer readable medium having such software or computer program recorded on it is a computer program product. The use of the computer program product in the computer preferably effects an advantageous apparatus for providing active user feedback in a graphic user interface in accordance with the embodiments of the invention.

The computer system 1000 comprises a computer module 1001, input devices such as a keyboard 1002 and mouse 1003, output devices including a printer 1015 and a display device 1014. A Modulator-Demodulator (Modem) transceiver device 1016 is used by the computer module 1001 for communicating to and from a communications network 1020, for example connectable via a telephone line 1021 or other functional medium. The modem 1016 can be used to obtain access to the Internet, and other network systems, such as a Local Area Network (LAN) or a Wide Area Network (WAN).

The computer module 1001 typically includes at least one processor unit 1005, a memory unit 1006, for example formed from semiconductor random access memory (RAM) and read only memory (ROM), input/output (I/O) interfaces including a video interface 1007, and an I/O interface 1013 for the keyboard 1002 and mouse 1003 and optionally a joystick (not illustrated), and an interface 1008 for the modem 1016. A storage device 1009 is provided and typically includes a hard disk drive 1010 and a

floppy disk drive 1011. A magnetic tape drive (not illustrated) may also be used. A CD-ROM drive 1012 is typically provided as a non-volatile source of data. The components 1005 to 1013 of the computer module 1001, typically communicate via an interconnected bus 1004 and in a manner which results in a conventional mode of operation of the computer system 1000 known to those in the relevant art. Examples of
5 computers on which the embodiments can be practised include IBM-PC's and compatibles, Sun Sparcstations or alike computer systems evolved therefrom.

Typically, the application program of the preferred embodiment is resident on the hard disk drive 1010 and read and controlled in its execution by the processor 1005.
10 Intermediate storage of the program and any data fetched from the network 1020 may be accomplished using the semiconductor memory 1006, possibly in concert with the hard disk drive 1010. In some instances, the application program may be supplied to the user encoded on a CD-ROM or floppy disk and read via the corresponding drive 1012 or 1011, or alternatively may be read by the user from the network 1020 via the modem
15 device 1016. Still further, the software can also be loaded into the computer system 1000 from other computer readable medium including magnetic tape, a ROM or integrated circuit, a magneto-optical disk, a radio or infra-red transmission channel between the computer module 1001 and another device, a computer readable card such as a PCMCIA card, and the Internet and Intranets including email transmissions and information
20 recorded on websites and the like. The foregoing is merely exemplary of relevant computer readable mediums. Other computer readable mediums may be practiced without departing from the scope and spirit of the invention.

The method of providing active user feedback in a graphic user interface may alternatively be implemented in dedicated hardware such as one or more integrated
25 circuits performing the functions or sub functions of providing active user feedback in a graphic user interface. Such dedicated hardware may include graphic processors, digital signal processors, or one or more microprocessors and associated memories.

Industrial Applicability

It is apparent from the above that the embodiment of the invention are applicable to the computer and data processing industries.

The foregoing describes only some embodiments of the present invention, and modifications and/or changes can be made thereto without departing from the scope and
5 spirit of the invention, the embodiments being illustrative and not restrictive.

~~Claims:~~ The Claims defining the invention are as follows:

1. A method of providing active user feedback in a graphic user interface, said method comprising steps of:
 - 5 selecting a soft control currently displayed on the graphic user interface, by means of which soft control a change is capable of being implemented; and displaying on said graphic user interface, only during said soft control selection, a pop-up preview reflecting said change.
- 10 2. A method according to claim 1, whereby said displaying step comprises a sub-step of:
 - superimposing said preview display region on at least one of a working area and a control area of said graphic user interface.
- 15 3. A method according to claim 1, whereby said displaying step comprises a sub-step of:
 - presenting a composite display of a present display state and a changed display state, said present and changed display states being associated with the change being implementable by the soft control.
- 20 4. A method according to claim 3, whereby said present and changed display states symbolically represent said present display state and said changed display state.
5. A method according to claim 3, whereby said present and changed display states
25 substantially represent said present display state and said changed display state.
6. A method according to any one of claims 3 to 5, whereby said composite display comprises a transition between said present and said changed display states.

7. A method according to claim 1, whereby said displaying step is capable of being one of enabled and inhibited.

8. A method according to claim 1, whereby said selection step comprises a sub-step
5 of:
positioning a cursor in a vicinity of the soft control.

9. A method according to claim 8, whereby said selection step comprises a further sub-step of:
10 passively designating said soft control by allowing the cursor to remain in the vicinity of the soft control for a first time period.

10. A method according to claim 8, whereby said selection step comprises a further sub-step of:
15 actively designating said soft control by an initial activation of an adjustment control.

11. A method according to claim 10, whereby said cursor is positioned using a pointing device, and said adjustment control comprises a control means of said pointing
20 device.

12. A method according to claim 4, whereby said initial activation of said adjustment control comprises a further sub-step of:
adjusting said adjustment control, thereby varying a soft control range in relation
25 to a current soft control setting.

13. A method according to claim 9, comprising further sub-steps of:

displaying a training preview reflecting a representation of a nominal change between said present display state and said changed display state, said preview being provided during said passive designation.

5 14. A method according to claim 13, whereby said representation further comprises a nominal change between a corresponding present display state and a corresponding changed display state of said soft control.

15. A method according to claim 14, whereby said representation of said nominal
10 change between the corresponding present display state and the corresponding changed display state of said soft control is capable of being one of enabled and inhibited.

16. A computer readable medium for storing a program for apparatus providing active user feedback in a graphic user interface, said program comprising:
15 code for a selecting step for selecting a soft control currently displayed on the graphic user interface, by means of which soft control a change is capable of being implemented; and
code for a displaying step for displaying a preview reflecting said change, said preview being provided during said soft control selection, using a preview display region
20 on said graphic user interface.

25

Dated 31 May, 2000
Canon Kabushiki Kaisha
Patent Attorneys for the Applicant/Nominated Person
SPRUSON & FERGUSON

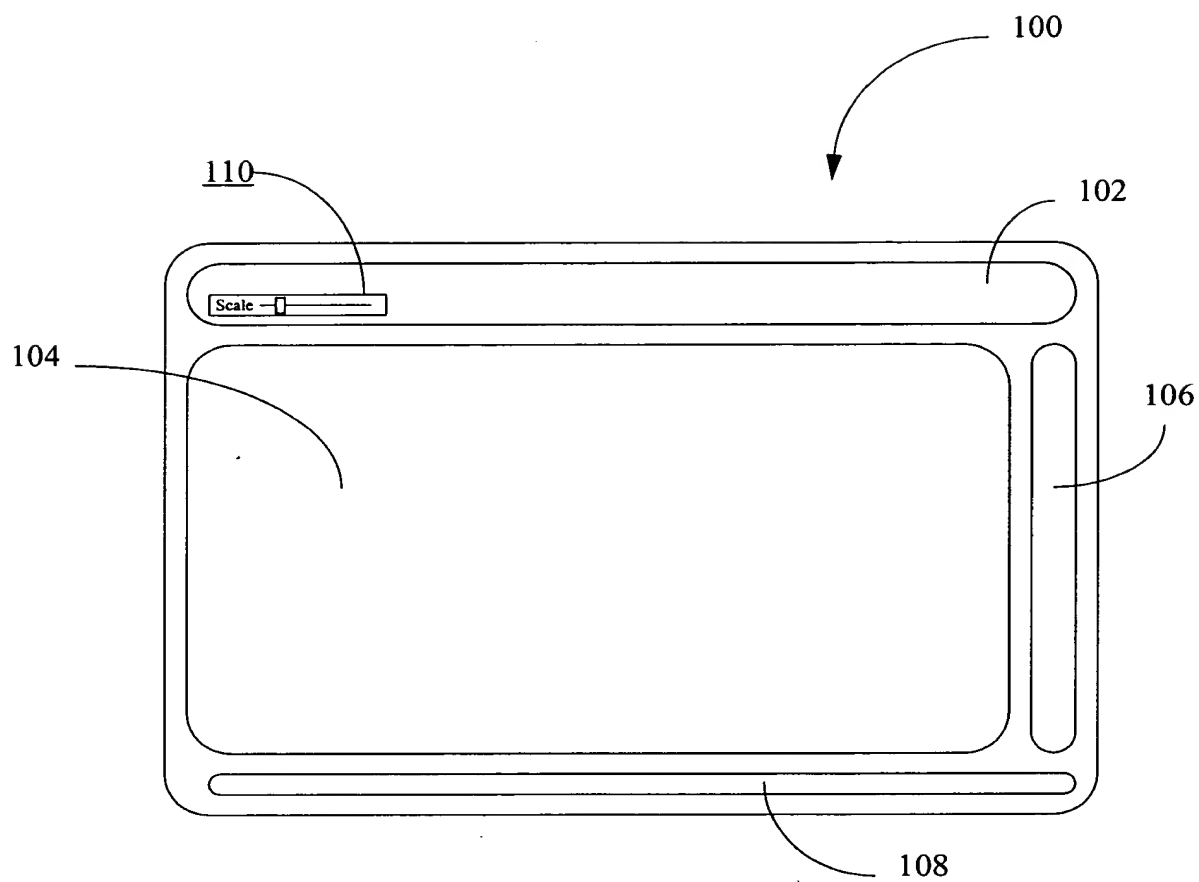


Fig. 1

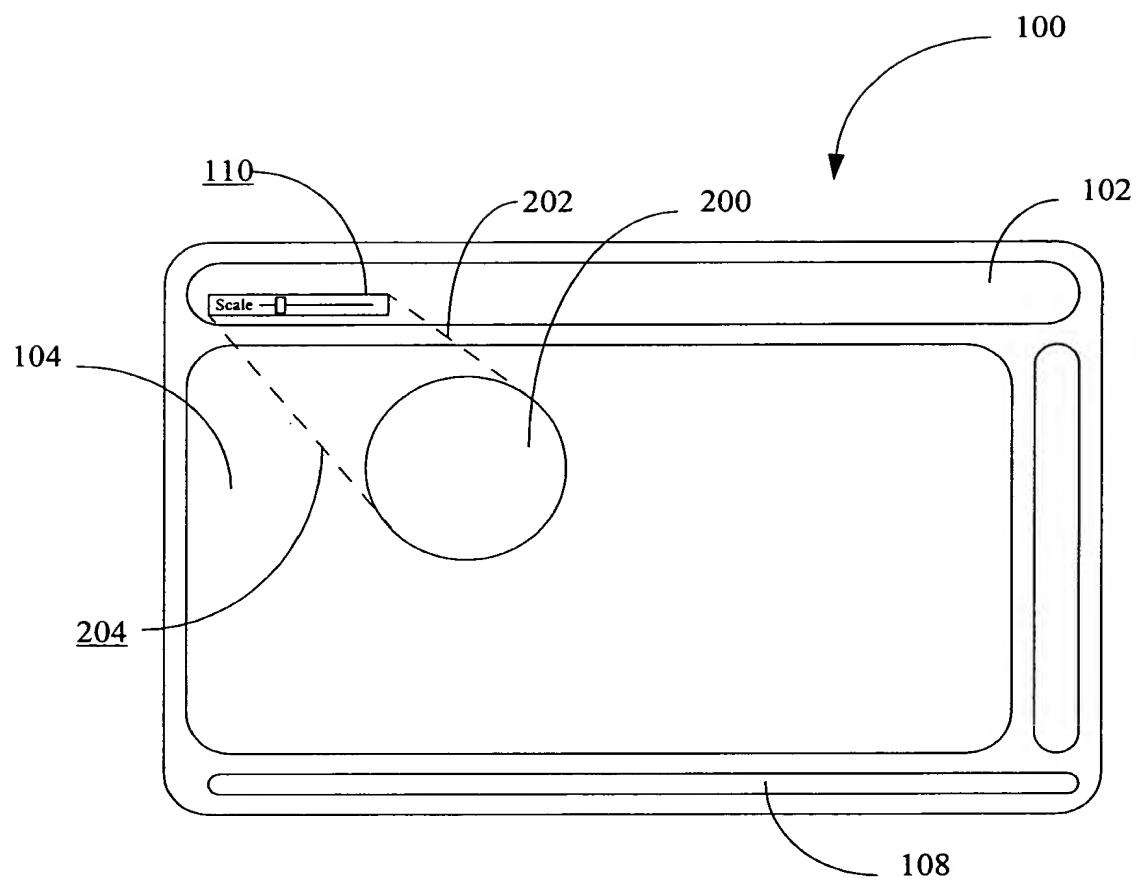


Fig. 2

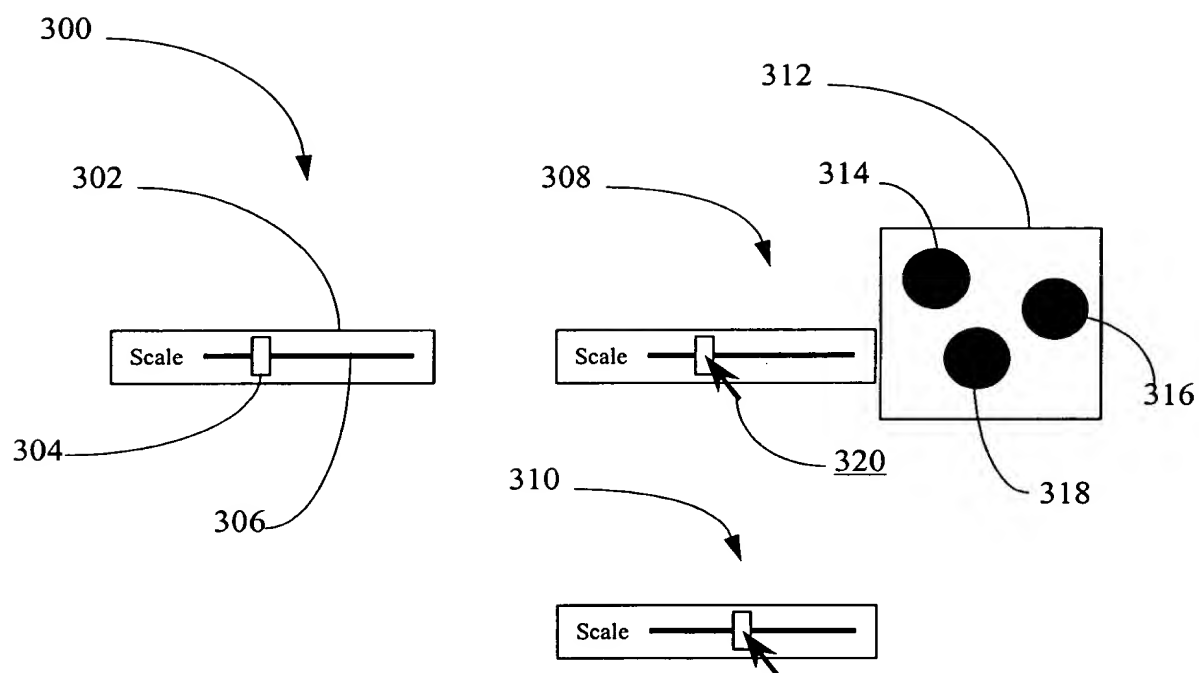


Fig. 3

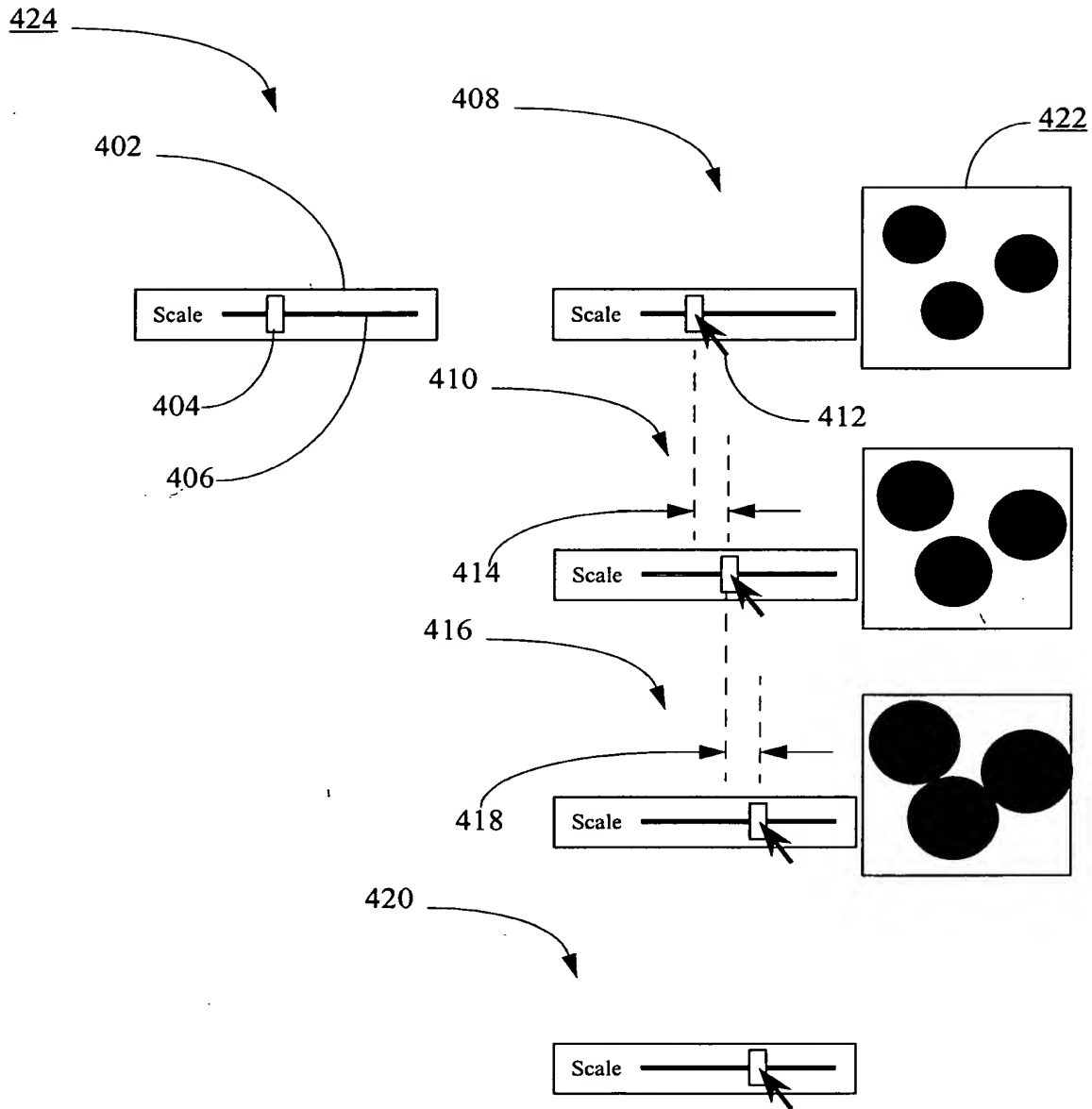


Fig. 4

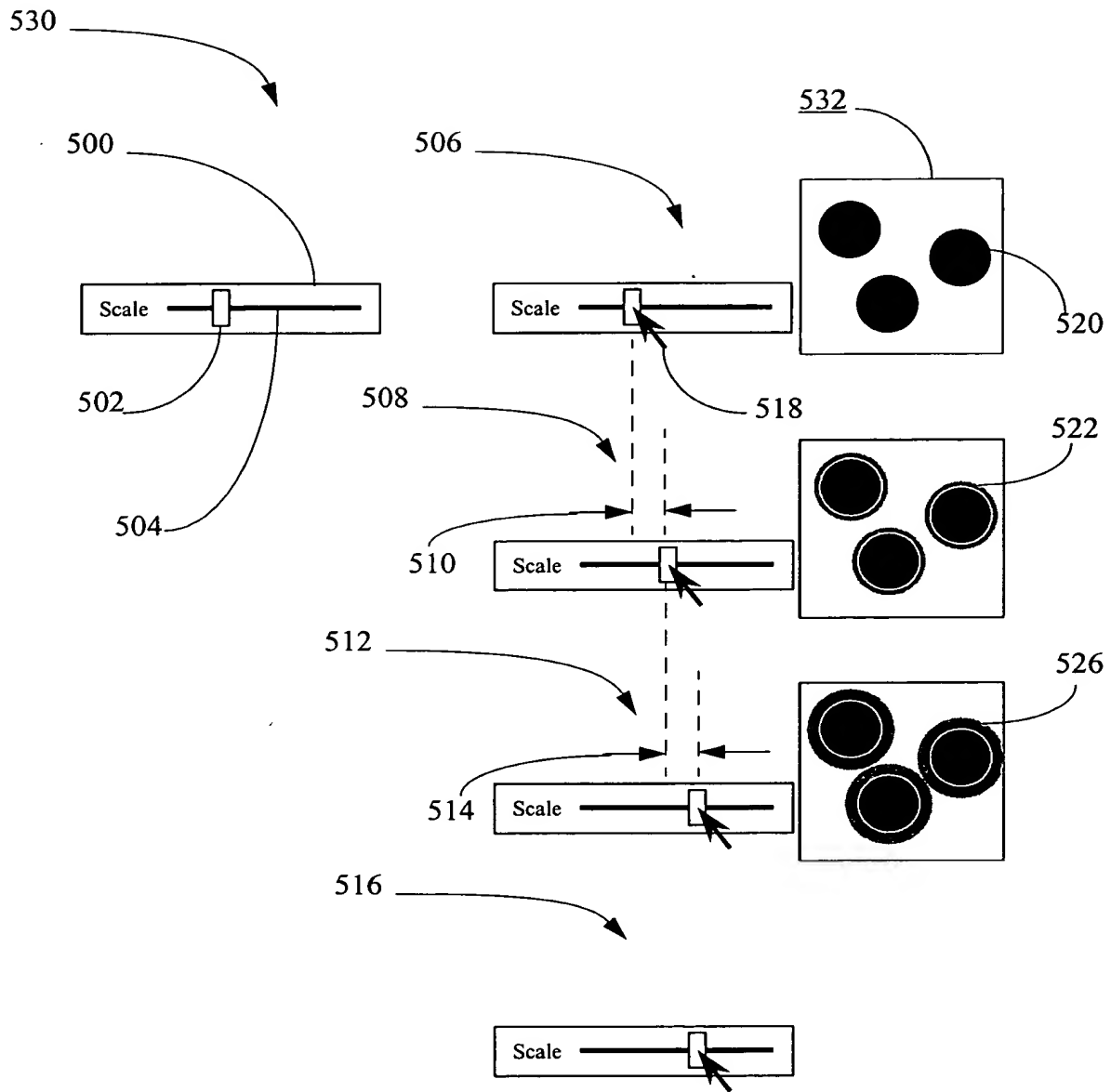


Fig. 5

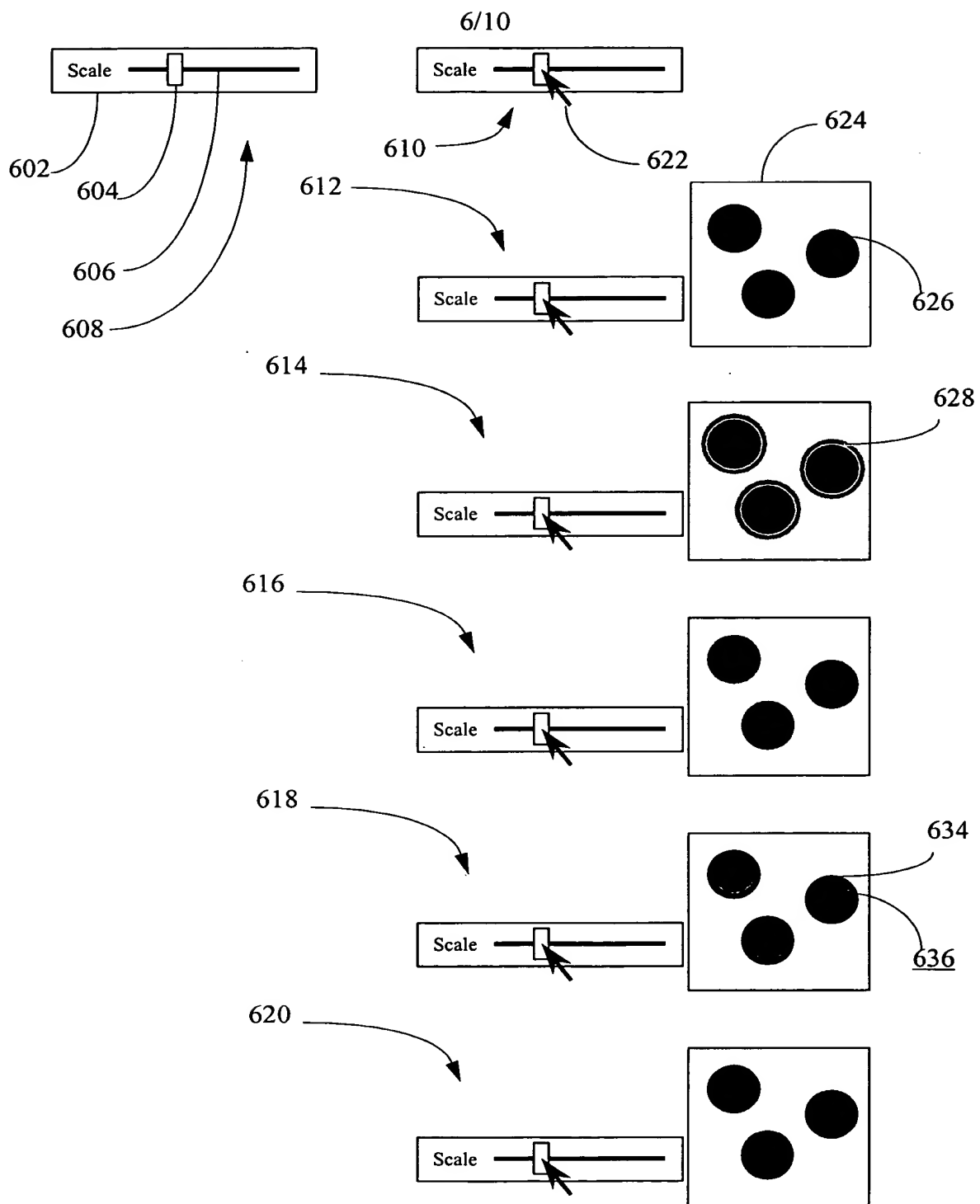


Fig. 6

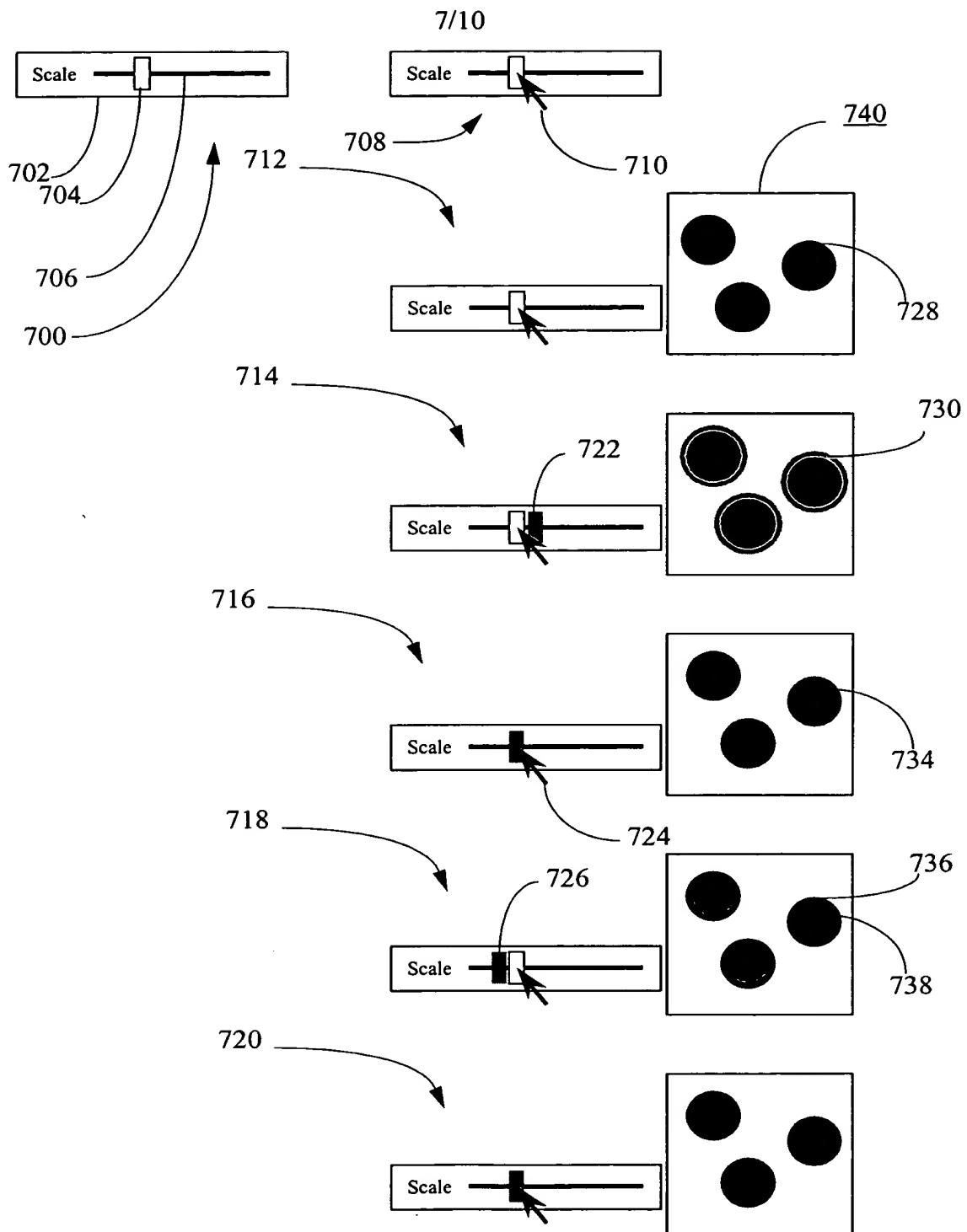
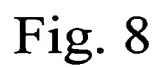


Fig. 7



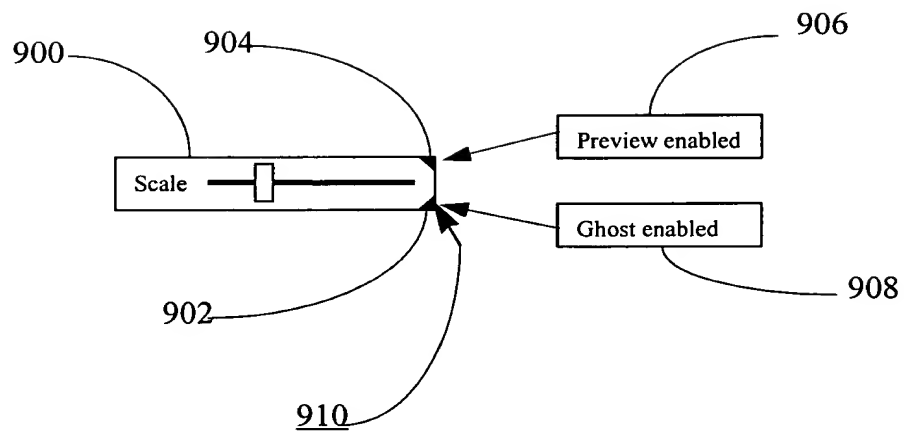


Fig. 9

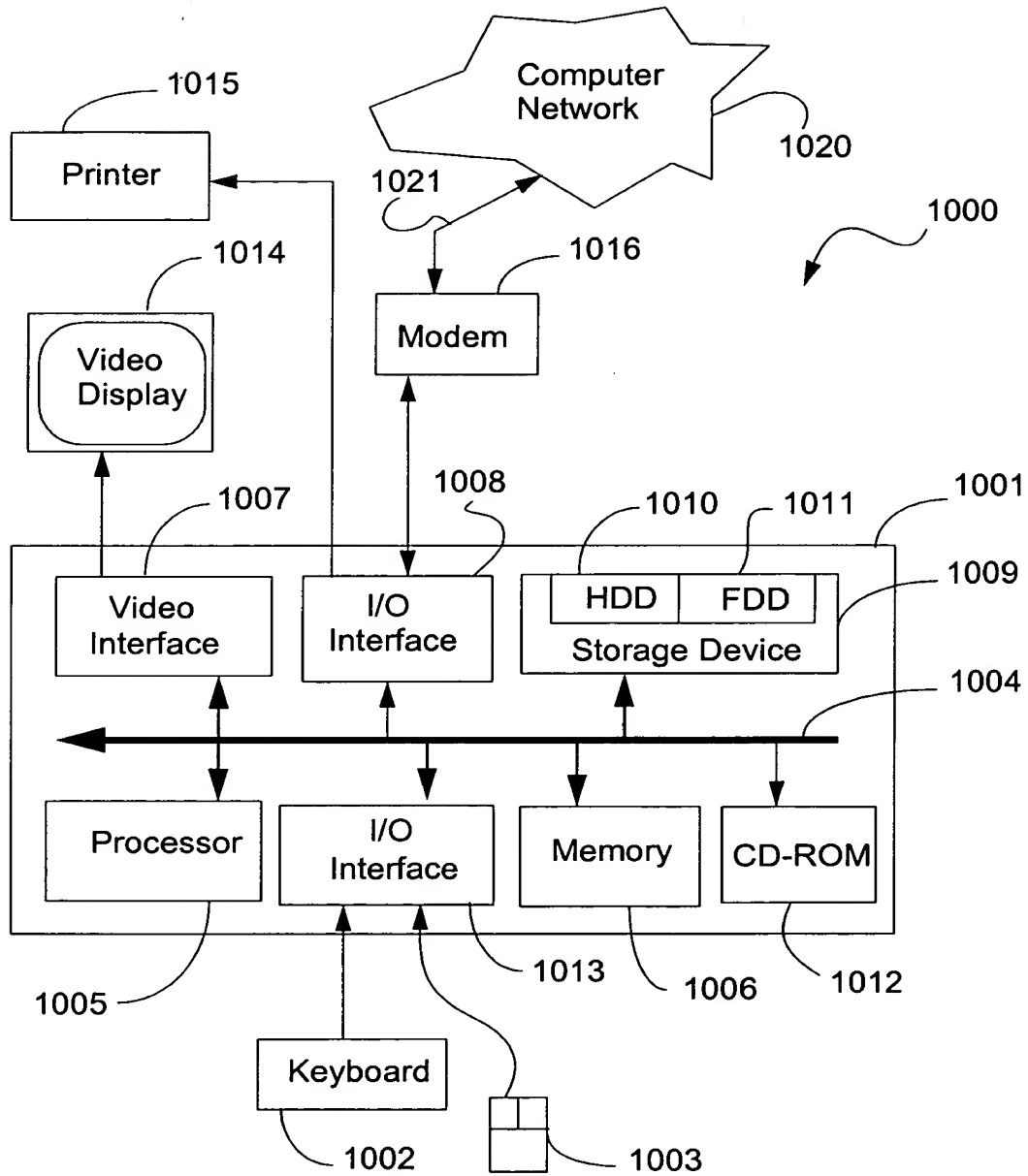


Fig. 10